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The concept of knowledge as a methodological instrument for analysing organizations and information systems

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THE CONCEPT OF KNOWLEDGE AS A METHODOLOGICAL INSTRUMENT FOR ANALYSING ORGANIZATIONS AND INFORMATION SYSTEMS

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Abstract

This work focuses of the concept of knowledge as instrument for inquiring into organization and information systems. For this proposal a threefold classification of this concept has been introduced: the individual sphere (the knowledge that is within each subject in the form of skills, values and beliefs), the organizational sphere (procedures, routines, roles and technology) and the inter-organizational sphere (opportunities, obligations, utilities and facilities that characterize the environment in which companies do business) of knowledge. Through this classification, a number of theoretical approaches are going to be taken into examination to see, respectively, which sphere of knowledge they cover. Therefore it will emerge that one approach can delineate in detail the inter-organizational sphere of knowledge having some limits to render the individual sphere and vice-versa.

The examination of organizations and information systems using this concept exhibits these methodological features: a methodology that permits the inspection in an organic way of the different aspects that characterize organizations and information systems; a methodology that evaluates the different theoretical approaches and a methodology that manages the data and information at our disposal. The latter can be directly assigned to one of the three spheres and then analysed according to an appropriate theoretical approach.

Keywords: knowledge, methodology, epistemology.

1 INTRODUCTION

Knowledge, in the present context, does not only represent the contents of books, what is taught at school and universities, or is considered the product of scientific experiments, but also what permits the transformation of inputs into outputs. This is the activity that takes place in any organization. However, in order to represent semantically this concept, three spheres need to be introduced: the individual sphere, the organizational sphere and the inter-organizational sphere of knowledge. The individual sphere represents the knowledge that is within each subject in the form of skills, values and beliefs; the organizational sphere is described by procedures, routines and roles, for example, and the inter-organizational sphere by all the opportunities, obligations, utilities and facilities that characterize the environment in which companies do business.

Given this threefold classification, we now need to ask the key question how are these three spheres of knowledge related to each other? In particular is there any one of these spheres that prevails for representing the concept of knowledge? In order to respond to these questions a number of theoretical approaches are going to be introduced. These are, respectively, the contextual approach, the social approach, the mood approach, Nonaka's concept of knowledge, the social capital approach, the new institutional economics or transaction-costs approach, the data approach and the decision approach. What is the reason for introducing a so large number of approaches in order to analyze the concept of knowledge?

One of the objectives of this paper is to show how each of these approaches has specific characteristics, which cover semantically some parts of the concept of knowledge represented by the three spheres of the classification introduced above. For example, one approach can delineate in detail the inter-organizational sphere of knowledge having some limits to render the individual sphere and vice-versa. The question now arises which principle will be followed to select the approach considered more appropriate for analyzing a specific issue? It will depend on the data and information at our disposal. Therefore if the data and information at hand concern, for example, the individual sphere of knowledge, an approach will be applied that can examine in detail these data and information compared to an approach that analyzes better the inter-organizational sphere.

However, another principle is going to be followed for selecting the appropriate approach. This principle is based on an epistemological perspective that overcomes the duality between subject and object. In fact objective epistemology maintains that it is possible to know something only if it is analyzed as an independent phenomenon. In this case the world exists apart from subjects' knowledge of it. On the other hand subjective epistemology maintains that the world is not separable from subjects who try to know it.

Most of the approaches that are going to be analyzed below try to overcome this duality between subject-object and, even if they tend to represent mainly one sphere, they all the same, describe the others. The word 'sphere' has been chosen just to suggest that there are not clear borders between the three spheres and this subdivision is just a tool to manage in a better way the concept of knowledge.

To sum up, the examination of organizations and information systems using this concept exhibits three distinct methodological features:

- A methodology that permits the inspection in an organic way of the different aspects that characterize organizations and information systems. In fact the subdivision of the concept of knowledge into three spheres is instrumental in simplifying the analysis but the final objective is to maintain a comprehensive perspective and not to focus on just some aspects of each sphere;
- A methodology (a meta-theoretical standpoint) that evaluates the different theoretical approaches. Each approach is characterized by specific attributes that make it appropriate for a specific kind of analysis. Understandably some of them turn out to be more effective to analyze a particular sphere than others;

- A methodology that manages the data and information at our disposal. The latter can be directly assigned to one of the three spheres and then analyzed according to an appropriate theoretical approach.

2 THE SPHERES OF THE CONCEPT OF KNOWLEDGE

When we think about the concept of knowledge many ideas immediately come to mind making its definition increasingly difficult. The task is still more problematic when used to analyze socio-economic entities such as organizations. Be this as it may, we should note that the word knowledge has recently become more and more popular in the field of the social sciences. Knowledge society, knowledge management and knowledge-intensive industry are apt examples of the diffusion and prevalence of the concept of knowledge amongst social scientists in different disciplines. The term knowledge management, in particular, is already an assumed approach in the academic and business environment and this research study considers this as a point of reference.

In the light of this discussion, therefore, an organization can be defined as a "totality of processes and resources that contains that knowledge, which is necessary to produce and deliver goods and services. This knowledge is not only in the mind of the personnel and their skills, but also is present in the procedures, products and technology used to produce these goods and services" (Ciborra, 1998 p.16). Even if this definition succeeds in describing clearly how the concept of knowledge can represent the transformation of inputs into outputs a more detailed analysis of this concept is required.

"In the mind of the staff and in its skills" (Ciborra, 1998 p.16) suggests that knowledge resides in the individual subject. He knows why, how, what and when to do, how to behave or to say what is proper in a specific context. He knows what is wrong and what is right. Acting on this knowledge he judges what was well done and what was not and he determines who is senior and who is junior etc. These aspects of knowledge represent the individual sphere of knowledge; that is the skills, traditions, values and beliefs of an individual; reflective of his personal background and his culture.

Spheres of Knowledge	Contents
Individual Sphere	Skills, traditions, values and beliefs of an individual; reflective of his personal background and his culture
Organizational Sphere	Procedures, routines, roles, practices, contextual mood, products and technology developed by an organization
Inter-organizational Sphere	Trust, reciprocity, civil society networks, social cohesion, opportunities, obligations, utilities and facilities offered by the environment in which organizations make business

Table 2. The three spheres of the concept of knowledge

"Into procedures, products and technology" (Ciborra, 1998 p.16) suggests that knowledge not only lies within the subject but also outside of it. These entities are the result of human activity. Technology and material products are invented and then produced through using and exploiting natural resources. On the other hand, procedures and routines are the result of social interaction. Therefore these entities may be considered as containers of an inherent knowledge (organizational sphere). What takes place is a transfer of knowledge (individual sphere) from subjects to objects and procedures (organizational sphere). Subjects project their thinking (individual sphere) upon their objects (organizational sphere). Thus the organizational sphere of knowledge may be represented by aspects such as procedures, routines, roles, practices, products and technology.

"To produce and deliver goods and services" (Ciborra, 1998 p.16)does not directly suggest a concept related to knowledge. However, organizations interact with their environment through customers and suppliers for example. This means that they need that knowledge to secure inputs and to place outputs. How is it possible to represent this knowledge? Through the role that institutions, such as banks,

central and local government agencies, universities and schools, for example, play in the organizations' environment. For example, the concept of social capital can be helpful for outlining this sphere. This concept, at first, was introduced by Coleman (1990) and resumed, among others, by Fukuyama (1995) and Putnam (1993), and has been defined by the characteristics of a social organization such as its level of trust, its norms of reciprocity and the extension of networks throughout the so-called civil society. Therefore any social organization is characterized by a different level of efficiency permitting or, on the other hand, impeding, to a certain extent, coordination among social actors (Putnam, 1993). Accordingly, the inter-organizational sphere of knowledge my be represented as a level of social cohesion, opportunities, obligations, utilities and facilities, offered by the environment in which enterprises do business (see Table n. 1).

3 COMPETENCE AND MOOD

The analysis of the concept of knowledge begins focusing on the action and its theory (Argyris and Schon, 1978) and particularly on competence and expertise mainly through Lanzara's work (1993). What is the meaning of competence in this context? Two different perspectives may be usefully compared at this point. The first one is related to actors' capability and the second to its connection to the specific environment in which actions take place.

The first aspect that analyzes the nature of competence stresses its cognitive base. That is, actors are endowed with mental set, programs, structures etc. that permit them to plan, act and which govern actions and behaviours. Chomsky (1957), in his analysis of language skills, argues how language competence is an abstract capability deeply structured in the actor. Analogically it is possible to maintain that this competence is independent from the nature of the task and the situation in which it takes place or at least they are considered only as obstacles to overcome. Therefore actors possess action programs that permit them to face the different situations in which they take part, according to experiences legitimized by their culture and social systems of which they are members. These programs are the result of an exploitation of subject's knowledge that can be represented by values, beliefs, traditions, rules, skills etc. This knowledge is embedded in the subjects and a cook or a physician, for example, are anything but an accumulation of a specific group of action programs. Therefore action programs are resources at hand - ready for use the different life events (see Figure n. 1).

The figure representing the concept of knowledge may require some clarifications. The oval represent the concept of knowledge in its entirety and, as it was above mentioned, it is composed by three different spheres: the individual sphere, the organizational sphere and the inter-organizational sphere. These three spheres have been delimited by dotted lines. The reason at the basis of the adoption of this type of lines is the presumption that each sphere has the same importance representing the concept of knowledge and, at the same time, due to the nature of the concept in exam, it is not separate neatly from other spheres. Concerning solid lines, they are related to the specific theoretical approach under examination outlining how it represents the three spheres of knowledge. That is, the ideal approach would cover the three spheres uniformly. This means that dotted lines and solid lines overlap perfectly. If it does not take place, a sphere prevails to the detriment of other spheres and solid lines indicate graphically the grade of this unbalancing.

We can now ask in which way does context affect competence? Let us, for example, consider the competence of a cook. In activity of cooking it is fundamental not only to know the procedure to mix and cook ingredients but also to know the kitchen. This means that the position of the kitchen tools and the characteristics of the oven are crucial for achieving a good result. In this way an action program is not sufficient to be competent. What is necessary is to restructure or expand action programs at one's disposal according to different situations.

Considering the role of the context in which the actions take place means that actions programs are not only the result of an abstract cognitive activity but also the results of the inputs at the subject's

disposal in that instant such as instruments, tools, materials, information etc. According to this viewpoint the environment plays a constitutive role in the execution of the action programs. In fact objects are not thought of in an abstract way but they are used to think and to act with. As in the Bateson example (1976) the action to fell a tree is composed of a circuit formed by the man, the tree and the axe in a process, that step-by-step, according to the inputs received continuously, leads to the tree being felled. Therefore the environment, or the context, without interruption, channels inputs to subjects through action (contextual approach. See Figure n. 2).

A further step in the analysis of competence concerns the social level. What happens if the environment is made up of human beings? It is in this context that other aspects of competence can be analyzed. For example, what is competent and what is not can be considered as a social construction. That is, it is the society or its sub-parts that recognizes and legitimizes or guarantees competence. Moreover subjects, in order to be competent, are members of specific social contexts that provide the atmosphere and setting in which they can acquire the necessary knowledge. For example, to be a professional, such as a lawyer or a physician, involves a socialization process through which one acquires the culture and identity of that specific professional community.

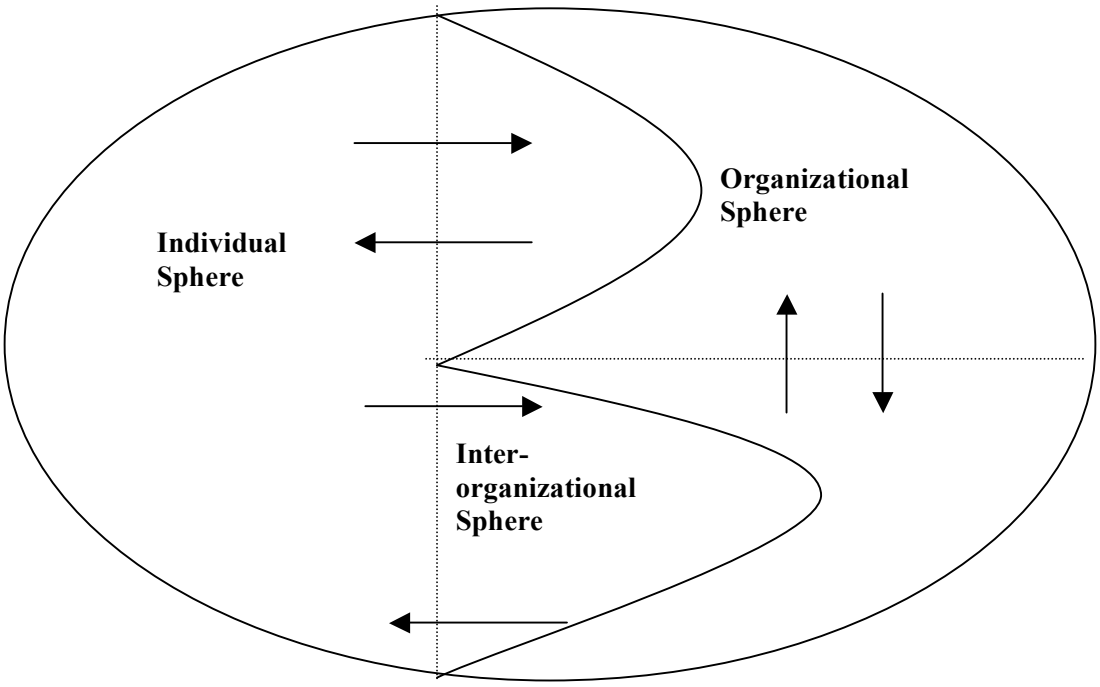

Figure 1. *The individual sphere, the organizational sphere and the inter-organizational sphere of knowledge according to the cognitive approach (dotted lines represent an equal subdivision of the concept of knowledge between the three spheres. Solid lines determine the role of each sphere for representing the concept of knowledge. Arrows suggest that there are not clear borders between spheres).*

But to be competent could also mean to interact in a coordinated way with other subjects, to follow some collective procedures and strategies, or to require other peoples' expertise. In these ways competence is inserted into social relationships and can be considered as a social phenomenon (social approach. See figure n.2) (Mead, 1966), (Douglas, 1986).

In his studies on improvisation as a crucial element in the organizational life needed to overcome sudden unpredictable situations, Ciborra (1999) (2001) introduces a new approach that reconsiders the role of the context and of the social level. Even if the actor's competence is affected by the situation in which it takes place, all the same the conception of the subject involved in these approaches does not differ too much from a robot that detects the context and answers consequently. In fact "Sequences of actions can be executed with constant interchange among a) receipt of information about the current state of the environment (perception), b) internal processing information (thinking), and c) response to the environment (motor activity)" (Vera and Simon, 1993, p. 13 quoted in Ciborra 2001). Though this quotation represents the main points of the cognitive approach according to the Artificial Intelligence perspective, the points above mentioned suggest that there is not a substantial difference compare to the actor's conception that emerges considering both the role of the context and of the social level. Here competence, for example, is still the result of subjective symbolic representations, learning, planning and problem solving activities, similarly to what is maintained by the cognitive approach. But the objective of Ciborra analysis is not only to underline the limits of cognitive approaches or their evolution but also to introduce new hypotheses in order to inquire about actors' condition in organizational and social life.

At the center of the analysis there is not only a cognitive robot that solves problems, learns about circumstances and plans or reacts to different contexts and social milieus but also an actor who, first of all, feels, has a mood and is attuned to a specific setting. That is, the subjects' emotional dimension is

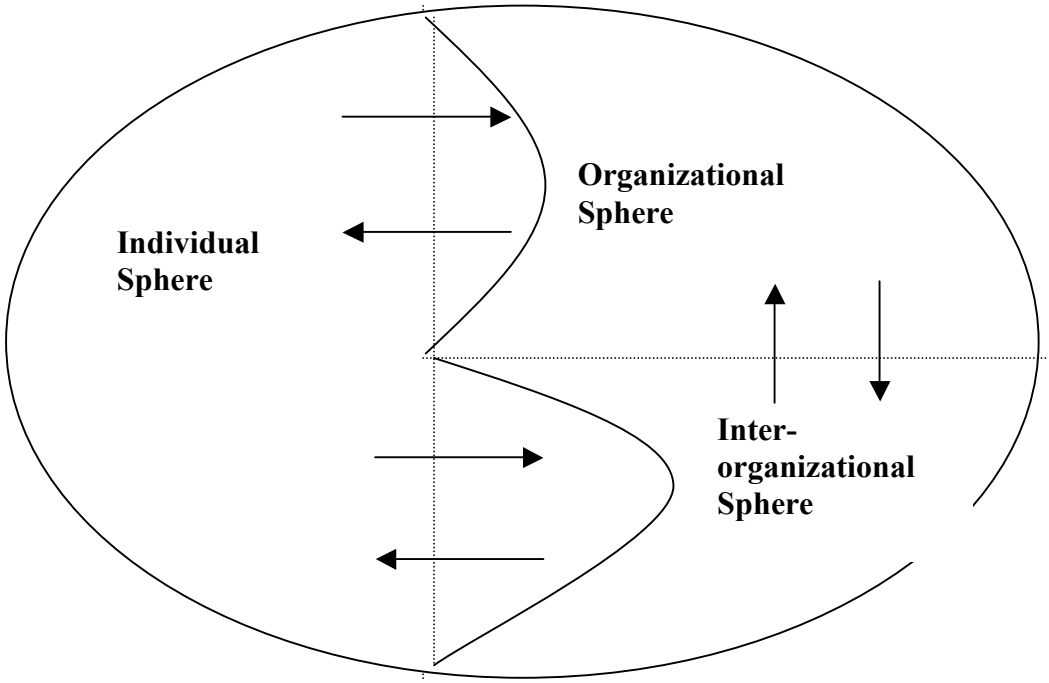

Figure 2. The individual sphere, the organizational sphere and the inter-organizational sphere of knowledge according to the contextual and social approach.

in the foreground and affects the situation in which the actors are involved. Here moods are particularly important. Fear, anxiety, happiness, panic or boredom permeate the actors' cognition and action as the ground in which subjects' actions grows up and take shape. For example, Berger and Luckmann (1966), in their analysis of social interaction in every day life, underline how, in face to face relations, the perception of the other through schemes, scripts and social roles (i.e. cognitive aspects) collides continuously with his/her presence and being. It is in the hic et nunc of the interrelation between the two subjects (the emotional dimension) that the shaping and the comprehension of the other and of the situation takes place. Therefore schemes and scripts can be

affected by the impact of this interaction and by the mood that characterizes it. However, in other cases, when a high level of anomie characterizes social relationships, the presence of the mood can be imperceptible and its role turns to be so pervasive that it seems that there is no mood at all. But, all the same, thinking, doing and acting are immersed in this medium that determines what matters and what does not (Heidegger, 1995) (See figure n.3).

What kind of implications has the analysis of competence and mood for the examination of the concept of knowledge? In particular, what indications in the dynamics among the individual sphere, the organizational sphere and the inter-organizational sphere of knowledge may be acquired?

In order to respond to these questions the approaches just dealt with will be reconsidered. Thus it is comprehensible that the individual sphere plays a more prominent role compared to the other spheres (See figure n. 1). According to the analysis of competence using the cognitive approach it seems that knowledge lies in the mind of subjects and what is represented by the organizational and inter-organizational spheres is anything but a whole of bonds, ties and obstacles to the execution of action. On the other hand if the context in which the competence takes place is considered constitutive of action programs or of a social phenomenon the inter-organizational sphere and mainly the organizational sphere play a far more relevant role in the analysis of knowledge (See Figure n. 2). That is, knowledge is not only in the subjects' mind; it is also deeply entangled in the context, in the objects, in the matter that are within subjects' reach and in the social milieu in which action programs takes place. Therefore, according to the analysis of competence, the interrelation between the individual and

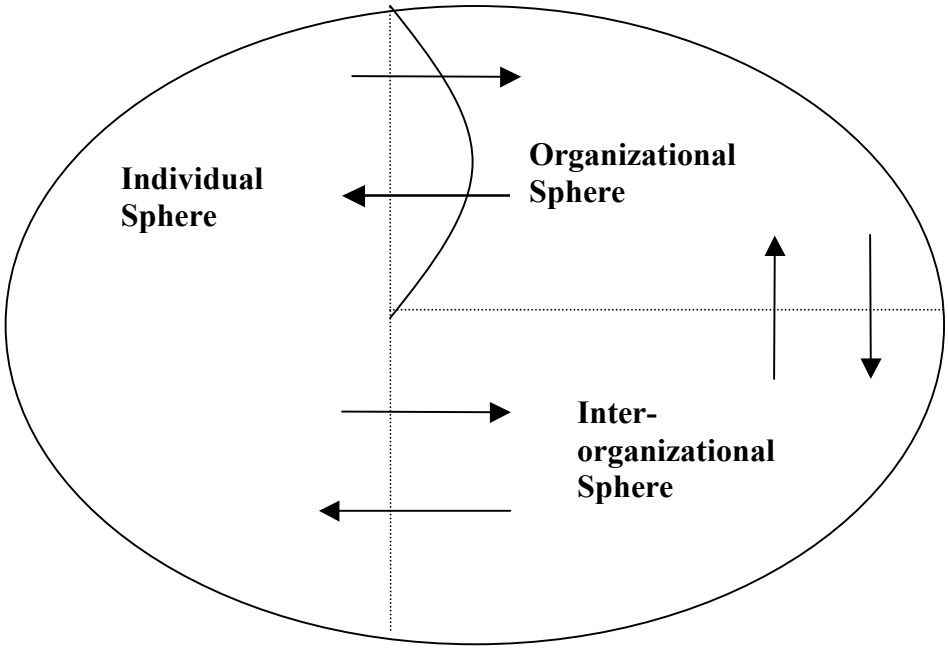

Figure 3. *The individual sphere, the organizational sphere and the inter-organizational sphere of knowledge according to the mood approach.*

organizational spheres seems to be the source of knowledge whereas, on the other hand, the role of the inter-organizational sphere seems peripheral and marginal.

Ciborra's analysis of improvisation in the organizational life questions this relationship between the individual sphere and the organizational sphere of knowledge. Even if actors are always entangled in a context and in a social milieu, all the same the cognitive aspect is preponderant in their interpretation. Subjects elaborate upon what is perceived from the exterior and react consequently. Therefore again the individual sphere emerges at the center of the concept of knowledge even if the organizational and inter-organizational spheres are not marginal as in the case of the cognitive approach (See figure n. 3).

How does the mood approach represent the concept of knowledge? One of the characteristics of this approach is to reconsider the role of the cognitive dimension by emphasizing the emotional dimension of action. Intuitively this dimension seems better represented by the individual sphere of knowledge but if mood is considered as a medium that pervades any situation even the other two spheres plays an important role in representing knowledge. In particular the organizational sphere is operative in shaping moods because of the influence of procedures, routines, roles, practices, institutions etc. Moreover, even if marginal, the role of the inter-organizational sphere should not be underestimated. The level of anomie, for example, is directly connected to this sphere and moods are so variables that any event may affect them.

4 NONAKA'S CONCEPT OF KNOWLEDGE

In their The Knowledge-Creating company (1995), Nonaka and Takeuchi focus on the modalities through which companies create knowledge in order to be innovative for reaching a competitive advantage. For these authors what characterizes the concept of knowledge is a double dimension: the ontological dimension and the epistemological dimension. The first concerns the diffusion of knowledge integral to which they have identified four levels: the individual level, the group level, the organizational level and the inter-organizational level. The epistemological dimension, on the other hand, is formed by two elements: tacit knowledge and explicit knowledge. In spite of the double dimension used to present this concept the individual level and the tacit knowledge play a crucial role. Why is the emphasis on these two elements so important? Nonaka and Takeuchi substantially maintain that knowledge is a subjects' product; it is individual and the other levels represent simply its diffusion. Concerning tacit knowledge, some more explanation is necessary. First of all, what does this concept mean? At first it was introduced by Polanyi (1966) to refer to the knowledge that is within subjects that is not easily transferable to others and can be communicated with difficulty. To subdivide it into technical knowledge and cognitive knowledge is a way to better understand this concept. The former can be represented by the term "know-how" and by the skills of an artisan, for example. The latter by the totality of mind-sets, beliefs, perceptions etc., usually taken for granted, that contribute to form a subject's reality. On the other hand, explicit knowledge can be easily communicated, shared and represented by data and numbers.

Even if these are just the basic elements of a model that will develop in the so-called spiral of knowledge and other precepts in order to create knowledge, it is intuitive to notice how it is strongly characterized by the cognitive approach. However, in a his more recent work (1998), Nonaka introduced the concept of "ba" as not only a physical or virtual (e-mail, teleconference, etc.) place but also mental (e.g. shared experiences, ideas, ideals), a time-space nexus in which is possible to create, share and exploit knowledge transcending members' roles and establishing an environment in which subjects can fully understand their selves as part of it. Therefore knowledge is embedded in "ba" otherwise is just information. That is, it can be communicated whereas knowledge resides in "ba" and dynamics that take place inside it.

To sum up, the concept of knowledge presented here has been analyzed using some approaches based on the theory of action, by the mood approach and finally it has been compared to the Nonaka's concept of knowledge.

The cognitive approach and Nonaka's model of knowledge, even though is not anymore the same after the introduction of the "ba" concept, stress the role of individuals and how knowledge is substantially represented in the mind of subjects, thus emphasizing the role of the individual sphere of knowledge. According to the contextual approach and the social approach the constitution of knowledge is more equally distributed among all the three spheres, even if the individual sphere still plays a predominant role and the inter-organizational one seems marginal and peripheral. The mood approach emphasizes the limits of the cognitive dimension and consequently of the individual sphere. Therefore the inter-organizational sphere and mainly the organizational sphere contribute substantially to determine that atmosphere that provokes moods.

5 SOCIAL CAPITAL AND SOCIAL RELATIONSHIPS

The role of the inter-organizational sphere of knowledge appears back on the stage through the concept of social capital as proposed by Coleman (1990), Putnam (1993) and Fukuyama (1995) and through the new institutional economics (Williamson, 1975).

Analyzing political and economic systems Fukuyama (1995) underlines how societies endowed with high social capital tend to have an economic structure based on big enterprises managed by professionals, whereas those societies characterized by low social capital have an economy based on SMEs run in a family context. However, what is it that distinguishes a high or low level of social capital? According to Fukuyama it is the level of trust. Therefore a low level of social capital will thus characterize societies, in which the family and relatives' networks play an important role, and in which solidarity does not overcome these borders, and an economic system based on SMEs. On the other hand, if trust overcomes the family level and diffuses into cultural, professional and business associations, for example, it is possible to reach a high level of social capital as in Japan, considered by Fukuyama to be the country with the highest level of this capital, in which there is an inner moral code that surmounts loyalty toward the family and permits the establishment of wide networks of economic relationships.

Social relationships may be considered as the means that form social life and basic elements of social structures. On this understanding a society may be defined as a network of relationships (Donati, 1996).

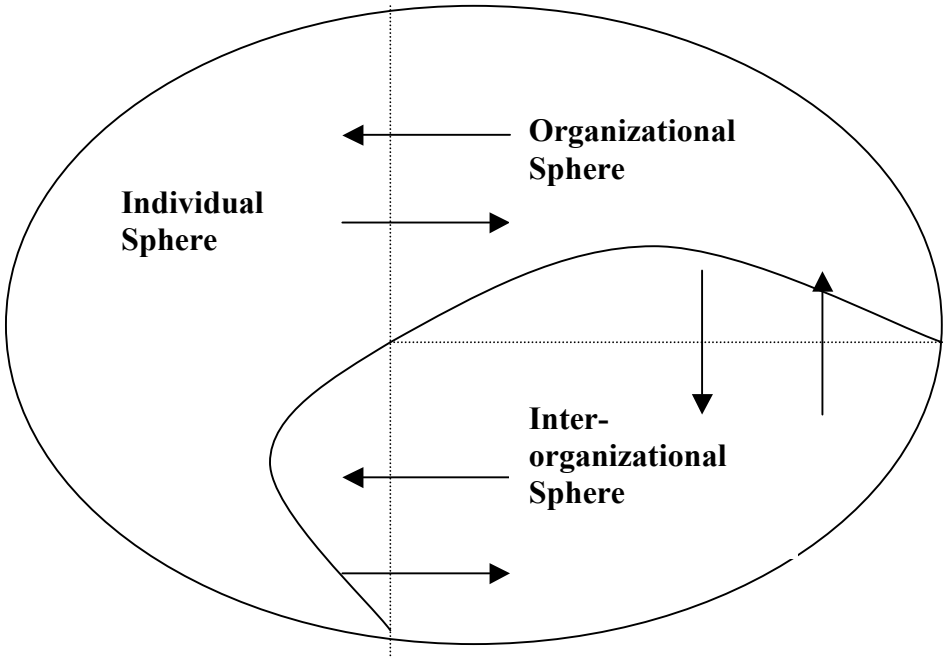

Figure 4. The individual sphere, the organizational sphere and the inter-organizational sphere of knowledge according to the social capital approach.

Wishes, feeling, plans, dreams, hopes etc. are expressed and pursued through relationships. But relationships are not only a form of showing the will of subjects but also the result of a social context in which they are plunged. Subjects live in an environment constituted by interaction models established over a long period. These interaction models are the result of history produced through

innumerable relationships legitimated by a specific community. In this way they become stable, steady and easily recognizable. In a word clusters of interaction models form institutions.

In order to analyze these clusters the new institutional economics (Williamson, 1975), reinterpreted by Boisot (1995), will be considered. Bureaucracy, market, fief and clan are the four ideal-types proposed by Boisot in order to represent social relationships. As ideal types, after Weber (1964), they represent the main characteristics of each relationship. Relationship tends to be unique, characterized by a different degree of institutionalization and are the result of a mixture of different institutional aspects. Ideal types, however, allow the simplifying of this mix by imputing relationships to each of them.

Even if the concept of social capital represents mainly the inter-organizational sphere of knowledge (see figure n. 4), an analysis of trust, for example, involves all the three spheres. Trust, in fact, is normally considered an interpersonal feeling, thus implying the role of the individual sphere, but according to Fukuyama trust is related to the level of the civil society involving even the role of the organizational sphere (See figure n. 4).

Even the new institutional economics underlines the role of the inter-organizational sphere of knowledge. Market relationships are typical of this sphere and to a certain extent even clan relationships can overcome the organizational sphere. However, clan, fief and bureaucratic relationships characterize mainly the organizational sphere of knowledge. It is in this context that the majority of social relationships take place. And what about the role of the individual sphere? Of course the protagonist of any relation is the subject. Therefore this sphere pervades all social relationships even if, in case they are highly institutionalized, the knowledge represented by the organizational and inter-organizational sphere will prevail. On the other hand, in case of low level of institutionalization, as in the case of friendship for example, subjects' will determines substantially the nature of relationship (See figure n. 5).

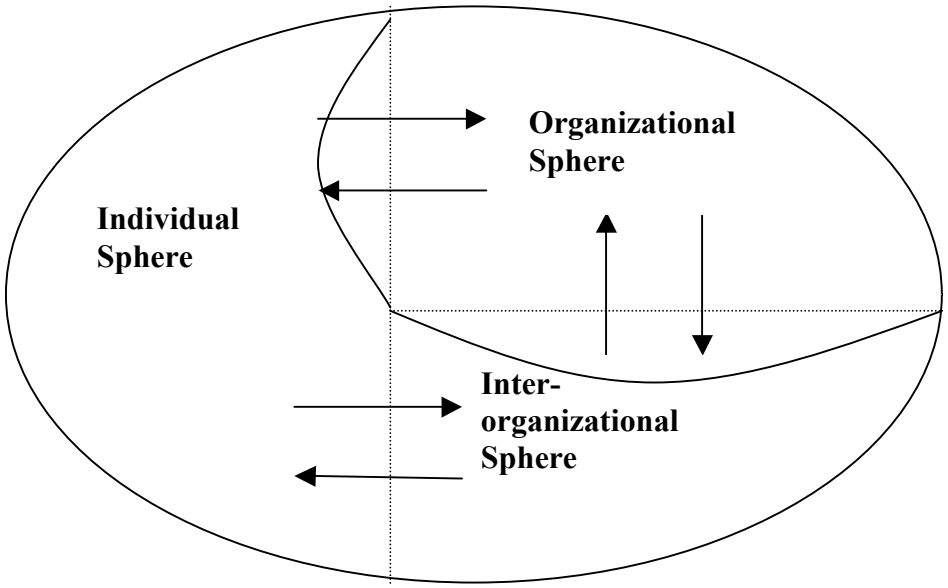

Figure 5. *The individual sphere, the organizational sphere and the inter-organizational sphere of knowledge according to the new institutional economics approach.*

6 THE CONCEPT OF KNOWLEDGE AND INFORMATION SYSTEMS

The objective now is to see if it is possible to use the concept of knowledge not only for studying organizations but also other parts of them and particularly information systems. Is it possible to single out those three spheres even in this case? Can these systems be represented by the individual sphere, the organizational sphere and the inter-organizational sphere of knowledge?

Ciborra and Lanzara (1994), introducing the concept of formative context (institutional instruments and mechanisms and the cognitive images and presuppositions associated with them), affirm that not only social constructs can be considered formative contexts but also information systems. In fact the cognitive level is subordinated to them because of their power to induce alternative ways of interpreting, interacting and communicating. Information systems incorporate modalities to collect, elaborate and distribute information able to modify and reformulate cognitive premises through which subjects interpret their world, act and communicate in specific situations. The institutional level is influenced in the same way because of the real rules, norms and limits posed by the introduction of these systems. Therefore what is emerging is a partial overlapping between content of knowledge here introduced and the concept of formative context. Even in formative contexts it is possible to single out an individual sphere (cognitive level) and an organizational sphere (institutional level) whereas, at a first glance, it looks like that the formative context does not represent the inter-organizational sphere. Is this sufficient to say that this sphere of knowledge do not represent information systems? The diffusion of the so called "information highway" and standards like the internet protocol would indicate the contrary. These factors has enlarged substantially the spectrum of these systems supporting exterior relationships as in the case of e-commerce portals.

At this point there should not be any obstacle to replicate the previous analysis. That is, see which aspects of the nature of information systems, represented by the concept of knowledge and its three spheres, is signified by the cognitive approach, the contextual and social approach, the mood approach etc. However we will confine our analysis to three already classical approaches for examining information systems: the data approach, the decision approach and the transaction-cost approach (Ciborra, 1993).

The data approach maintains that information systems are anything but instruments for allocating data flows and files required by an organization. What is fundamental is to determine information necessities in the different organizational levels in order to computerized their transmission. The decision approach is more sophisticated and information systems are seen as apparatuses for supporting decision making processes. Complex tasks and turbulent environments are faced increasing the quantity of information available and reducing, in this way, the level of uncertainty of managers involved in day-to-day activities. The transaction-cost approach or the new institutional economics has already been introduced above. According to this approach "the information system of a business organization can be transactionally defined as the network of information flows that are needed to create, set up, control and maintain the organization's constituent contracts" (Ciborra, 1993 p. 116). That is, the focus, in this case, is to design information systems for supporting different organizational forms (market, bureaucracy, clan and fief) and this means that their characteristics and features will vary according to them.

How do these three approaches represent the concept of knowledge? The data approach, underlining data flows and files, is not in the ring of the individual sphere of knowledge. On the other hand, it should be clear how it is represented by the organizational sphere. Procedures, routines and practices are affected by these flows. It is difficult to say what is the role of the inter-organizational sphere. For sure the diffusion of the internet protocol has enlarged substantially the range of action of this approach and the related knowledge potentially established through it.

The decision approach, stressing the role of information systems supporting cognitive aspects of decision making processes, concerns the individual sphere of knowledge. In fact it outlines systems able to affect managers' attitudes and mind-sets in their every day activities. But what about the organizational sphere and the inter-organizational sphere? Their role seems marginal. They represent a secondary knowledge in view of individuals' needs.

Concerning the transaction-cost or new institutional economics approach we can repeat what it was mentioned above analysing the organizational level. In fact it seems that all the three spheres represent knowledge implicated by information systems seen according to this approach. In fact, above mentioned e-commerce portals are just an example of the inter-organizational sphere but the approach under examination does not leave out even other spheres. The organizational one because bureaucracy, clan and fief characterize their own system and the individual one because any transaction see subjects protagonists and information systems may affect their behaviours.

7 EPISTEMOLOGICAL PERSPECTIVE

The question now is to see the epistemology that underpins the concept of knowledge here introduced. Epistemology is the branch of philosophy that studies the way through which we know the world (Hatch, 1997) outlining the modalities that have been followed for researching. Two big categories characterize it: objective epistemology and subjective epistemology. The former is based on the assumption that is possible to know something only if we analyze it as an independent phenomenon. That is, the world exists apart from subjects' knowledge of it. On the other hand, according to subjective epistemology, knowledge of the world is intrinsically affected by subject's direct involvement in knowing. Therefore knowledge cannot be separated from the knowing subject who owns or appropriates it.

It is intuitive a strict connection between subjective epistemology and the individual sphere of knowledge. This sphere underlines individuals' cognitive aspects that clearly are in the circle of subjective epistemology. On the other hand, the organizational sphere and the inter-organizational sphere are in the circle of objective epistemology as these spheres take into consideration elements that are outside the range of action of individuals.

However, only the cognitive approach, the decision approach and the data approach are clearly in one of these two epistemological perspectives and precisely the first and the second are in the circle of subjective epistemology whereas the third is in the circle of objective epistemology. In the other cases, the assignment of each approach to a definite epistemological perspective is problematic. We are in a situation in which it is not possible to distinguish between object-subject and agent-environment (Ciborra-Lanzara, 1999). The overlapping between spheres requires to go beyond these dichotomies and to turn to perspectives in which the concept of existence and being are not separated from the world in which subjects exist as existence is always contextual and related to the world as the source of inputs (Heidegger, 1962).

In this understanding, the concept of knowledge here introduced and its spheres lead us to a further distinction. That is, the theoretical approaches that characterize themselves because of the overlapping of mainly two spheres (the contextual approach, in the social approach, Nonaka's concept of knowledge and the mood approach) and approaches that covers significantly all the three spheres singled out (social capital approach and the new institutional economics).

To sum up, the objective, now, is not that one to order approaches according to their availability to represent the concept of knowledge but to try to outline their own proper specifications and characteristics. It may be the case that, because of research activity conditions, data and information at disposal, etc. approaches that belong to the subjective or the objective epistemologies are considered more useful to the objectives of the research even though using a perspective that overcome the duality between objectivity and subjectivity consent to cover wider aspects of the concept of knowledge.

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